

REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow. Claims 1-40, 43-44, 51-52, and 59-60 were previously canceled. Claims 41, 42, 45-50, 53-58, and 61-75 are pending in this application.

I. Rejection of Claims 41, 42, 45, 49, 50, 53, 57, 58, and 61-75 Under 35 U.S.C. § 103

On page 3 of the Office Action, Claims 41, 42, 45, 49, 50, 53, 57, 58, and 61-75 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2006/0209982 to De Gaudenzi et al. (hereinafter “De Gaudenzi”) in view of Dabak et al., “Signal Constellations for Non-Gaussian Communication Problems,” Statistical Signal and Array Processing, Minneapolis, April 27-30, 1993, Proceedings of the International Conference on Acoustics, Speech and Signal Processing (ICASSP), New York, IEEE, US, 4:33-36 (hereinafter “Dabak”). Applicants respectfully traverse the rejection.

Independent Claim 41 recites, in part, “determining a characteristic of a wireless channel; selecting a signal constellation from a plurality of signal constellations based on the determined characteristic.” (Emphasis added). Independent Claims 49 and 57 recite similar elements. Claim 42 recites, in part, that “the characteristic comprises a signal to noise ratio.” Claims 50 and 58 recite similar elements. Applicants respectfully submit that De Gaudenzi and Dabak, alone or in combination, fail to disclose, teach, or suggest at least these elements.

De Gaudenzi is directed to a “new class of 16-ary Amplitude and Phase Shift Keying (APSK) coded modulations.” (Abstract). As such, De Gaudenzi teaches a new modulation scheme for use with different coding schemes. However, Applicants respectfully submit that De Gaudenzi fails to disclose “selecting a signal constellation from a plurality of signal constellations based on the determined characteristic [of a wireless channel],” as recited in Claims 41, 49, and 57.

On page 3 of the Office Action, the Examiner asserted that De Gaudenzi discloses that a “nominal signal to noise ratio for transmitting the digitally modulated signal is determined (claim 1)” and that a “signal constellation is chosen so as to maximize a minimum geometrical distance between the pairs of points of the digital constellation (claim 1).” Claim 1 of De Gaudenzi states:

1. A digital modulation method comprising:
determining a nominal signal to noise ratio for transmission of a digitally modulated signal;
generating a stream of modulation symbols; and
mapping said modulation symbols to a digital signal constellation in order to produce a modulated signal, said digital signal constellation comprising a number of digital signal points equally spaced on at least two concentric rings having respective predetermined radii, the digital signal points on each ring having a predetermined relative phase shift with respect to the signal points on the other rings,
wherein, for a signal constellation with normalized power, at least a ratio of the radii of said concentric rings is **chosen** so as to maximize a minimum geometrical distance between pairs of points of said digital signal constellation.

(Emphasis added). As such, claim 1 of De Gaudenzi states only that a signal to noise ratio is determined, that modulation symbols are mapped to a signal constellation, and that the signal constellation was created such that a minimum geometrical distance between pairs of points of the constellation are maximized. However, claim 1 of De Gaudenzi fails to disclose any type of relationship between the signal to noise ratio and a selection of the signal constellation. In addition, nowhere does claim 1 or the rest of De Gaudenzi teach “selecting a signal constellation from a plurality of signal constellations based on the determined characteristic,” as recited in Claims 41, 49, and 57, or that the “characteristic [on which the selection is based] is a signal to noise ratio,” as recited in Claims 42, 50, and 58. If the Examiner further contends that De Gaudenzi does provide such a teaching, Applicants respectfully request that the Examiner specifically point out where in De Gaudenzi such a teaching of the “selecting” is provided.

Dabak also fails to disclose “selecting a signal constellation from a plurality of signal constellations based on the determined characteristic [of a wireless channel],” as recited in Claims 41, 49, and 57. Dabak is directed to a procedure for determining or constructing optimum signal sets. (Abstract). Dabak describes a procedure in which optimum signal constellations are designed using logarithmic error probability rates that are determined based on Kullback information. However, Dabak fails to disclose at least “selecting a signal constellation from a plurality of signal constellations based on the determined characteristic [of a wireless channel],” as recited in Claims 41, 49, and 57.

Therefore, De Gaudenzi and Dabak, alone and in combination, fail to teach, suggest, or describe all of the elements of at least independent Claims 41, 49, and 57. A rejection under 35 U.S.C. § 103(a) cannot be properly maintained where the combination of references fail to teach each and every element of the claims. The remaining claims depend from one of Claims 41, 49, and 57. Therefore, Applicants respectfully request withdrawal of the rejection of Claims 41, 42, 45, 49, 50, 53, 57, 58, and 61-75 under 35 U.S.C. § 103(a).

II. Rejection of Claims 46-48 and 54-56 Under 35 U.S.C. § 103

On page 4 of the Office Action, Claims 46-48 and 54-56 were rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over De Gaudenzi in view of Dabak and further in view of U.S. Patent No. 7,269,436 to Won (hereinafter “Won”). Applicants respectfully traverse the rejection.

Claims 46-48 depend from Claim 41. Claims 54-56 depend from Claim 49. As discussed in Section I above, De Gaudenzi and Dabak fail to teach all of the elements of at least Claims 41 and 49. Won also fails to teach, suggest, or describe a “selecting a signal constellation from a plurality of signal constellations based on the determined characteristic [of a wireless channel],” as recited in Claims 41 and 49. Therefore, De Gaudenzi, Dabak, and Won, alone and in combination, fail to teach each and every element of at least Claims 41 and 49.

Additionally, Claim 46 recites:

The method of claim 41, wherein selecting the signal constellation from the plurality of signal constellations is further based on a number of transmit antennas used in transmitting the modulated carrier wave.

(Underlining added). Though of different scope, Claim 54 recites a similar feature. On page 5 of the Office Action, the Examiner acknowledged that De Gaudenzi and Dabak do not disclose “the number of transmit antennas is determined from a message received over the wireless channel.”

The Examiner, however, stated on page 5 of the Office Action that:

Won discloses the transmitter can estimate the channel covariance matrix using a preamble transmitted from the receiver. The transmitter can also update the number of antennas and the power allocation according to the eigenvalues of the estimated covariance matrix (column 7, lines 42-48). Therefore, the number of transmit antennas is determined from the information in the preamble (header) of the received signal. Won discloses transmitting information from the antennas. The signal constellation of the combination is selected based on the modulated transmitted signal. Therefore, the selecting of the signal constellation will be based on (dependent on) a number of transmit antennas used to transmit the signal.

(Emphasis added). Applicants respectfully disagree.

The Abstract of Won states:

A method and apparatus for allocating a power in a multiple-input multiple-output communication system is disclosed. A method of allocating power can include estimating a channel condition based on a reference signal received from a receiver, estimating power gains from the estimated channel condition, and determining respective power levels of transmission signals and a number of available antenna elements for the transmission signals by using the power gains.

(Emphasis added). Column 7, lines 42-48 of Won states:

For example, the transmitter can estimate the channel covariance matrix (e.g., the change of the channel for each burst unit (normally, size of 100 symbols)) using a preamble or midamble transmitted from the receiver. The transmitter can also update the number of antennas and the power allocation according to the eigenvalues of the estimated covariance matrix and the size of the eigenvalues.

Accordingly, Won teaches a method for allocating power in a communication system that includes determining a number of available antenna elements. The number of available antenna elements are determined according to the eigenvalues of the estimated covariance matrix. As such, Won teaches only that a number of antenna elements can be determined based on an estimated channel condition. However, Won fails to disclose “selecting a signal constellation” based on this determined number of antenna elements.

As seen above, the Examiner stated on page 5 of the Office Action, that the “signal constellation of the combination is selected based on the modulated transmitted signal.” It is unclear where the Examiner finds support for this assertion. Nowhere has the Examiner established that the combination of De Gaudenzi and Dabak teaches such a selection. As discussed above with respect to Claims 41, 49, and 57, De Gaudenzi and Dabak fail to disclose selection of a signal constellation.

Furthermore, the Examiner appeared to assert that because a modulated transmitted signal is transmitted from one or more antennas, the selecting of the signal constellation is based on a number of antennas. Applicants respectfully disagree and submit that the Examiner mischaracterized the plain claim language of Claims 46 and 54. Even if the combination of De Gaudenzi and Dabak did teach that the selection of the signal constellation was based on information received from a modulated transmitted signal (which it does not), the selection of the signal constellation is not based on the number of antennas merely because it is transmitted by the antennas. The actual number of antennas transmitting the signal would be irrelevant so long as the information communicated by the signal (and on which the signal constellation selection is

actually based) was received. It would not matter if one antenna or ten antennas communicated the signal.

As a result, Applicants respectfully submit that De Gaudenzi, Dabak, and Won further fail to teach, suggest, or describe all of the elements of at least Claims 46 and 54. A rejection under 35 U.S.C. § 103(a) cannot be properly maintained where the references fail to teach each and every element of the claims. Therefore, Applicants respectfully request withdrawal of the rejection of Claims 46 and 54 under 35 U.S.C. § 103(a) for at least this additional reason. For at least the same reasons, Applicants respectfully request withdrawal of the rejection of Claims 47-48 and 55-56, which depend from Claims 46 and 54, respectively.

* * *

It is submitted that each outstanding rejection to the Application has been overcome, and that the Application is condition for allowance. Applicants respectfully request consideration and allowance of all pending claims.

It should be noted that although arguments have been presented with respect to certain claims herein, the recited subject matter, as well as various other subject matter and/or combinations of subject matter, may be patentable for other reasons. Further, the failure to address any statement by the Examiner herein should not be interpreted as acquiescence or agreement with such statement. Applicants expressly reserve the right to set forth additional and/or alternative reasons for patentability and or allowance with the present Application or in any other future proceedings, and to rebut any statement presented by the Examiner in this or other papers during prosecution of the present Application.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to

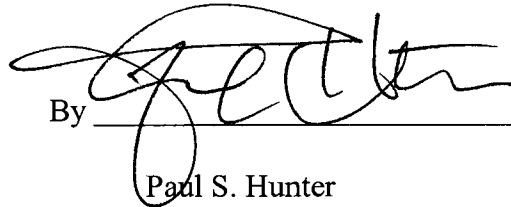
Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date October 6, 2009

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4292
Facsimile: (608) 258-4258

By



Paul S. Hunter
Attorney for Applicant
Registration No. 44,787